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sion of the soil. In the limestone region in the southeastern part of Clay county, there are several species of trees which do not pass over into the sandstone district. The trees which finally crowd out the cottonwood are few in number and are of the following species: *Negundo aceroides* Moench, *Gymnocladus Canadensis* Lam., *Gleditschia triacanthos* L., *Cercis Canadensis* L., *Fraxinus viridis* Mx., *Ulmus fulva* Mx., *Ulmus Americana* L., *Celtis occidentalis* L., *Morus rubra* L., and *Juglans nigra* L. Thus, in the older forests, the cottonwood trees stand here and there as solitary giants, crowded on all sides by the newer occupants.

There seems to be good evidence that these timber belts never advanced outward from the river, but rather that fire and prairie grass were continually encroaching upon the forest areas, restricting them to narrow belts along the river, although the river bottoms in some places are several miles in width.—JOHN H. SCHAFFNER, *Columbus, O.*

THE SPREADING OF BUFFALO GRASS.

I HAVE several times read the statement that the buffalo grass, *Buchloe dactyloides* Engelm., is being crowded out and exterminated in regions which have been settled for some time. This does not agree with my own observations, which extend through a period of over twenty years in Clay county, Kansas, a region where this grass is quite common, although it occurs only in small patches here and there in the prairie. Of course, the sum total in a given region would be less at the present time than formerly on account of the great areas now under cultivation. But in the pastures the grass has spread considerably. I know of patches which are at present from six to ten times their original area twenty five years ago when the country was first settled. There are also many places, formerly destitute of buffalo grass, which are now practically covered with it, other species being crowded out.

This increase of the buffalo grass in the pastures is without doubt due to the continual tramping of cattle, which destroys the other common prairie-grasses but does not seem to be injurious—rather beneficial—to the buffalo grass.

I also know of a patch in a yard which has remained a thick sod for twenty five years, while all the other grasses have long since been destroyed and their place taken by weeds and introduced grasses.

In the region under consideration, the buffalo grass usually grows

along the banks of ravines and at the base of hilly slopes where conditions are rather unfavorable. There are a number of characteristic grasses, which go to make up the great bulk of the prairie. The little blue stem or bunch grass, *Andropogon scoparius* Michx., grows mostly on the hills and ridges, while the big blue stem, *Andropogon furcatus* Muhl., occupies the more level and richer areas. Along with the big blue stem the Indian grass, *Chrysopogon nutans* (L.) Benth., and the switch grass, *Panicum virgatum* L., occur in considerable abundance, while in very wet ravines it is largely displaced by the slough grass *Spartina cynosuroides* Willd.—JOHN H. SCHAFFNER, *Columbus. O.*

A WASHING APPARATUS.

(WITH FIGURE.)

FOR some time we have felt the need in our laboratory of an apparatus adapted to washing material fixed in certain solutions, such as chromic acid and Flemming's chromo-aceto-osmic mixture. Such a device should be at once simple in structure, capable of accommodating several bottles of material at once, and should provide a current of water strong enough to insure a constant and gentle agitation of the material, and at the same time one not so violent as to injure the most delicate tissues.

Such an apparatus has been made for our own laboratory, and after a year of use it fills all the requirements so perfectly that it has been thought desirable to publish a description of it in the hope that others might profit by our experience. It consists, essentially, of a trough supported on legs, and provided with a cork bottom, through holes in which are passed glass tubes drawn out to a point at the lower end. When the material is ready for washing, a fine meshed cloth is stretched over the mouth of the bottle, and held in place by a rubber band. The bottle is then placed beneath the trough, and one of the tubes is lowered until the pointed end projects through the cloth into the bottle. If water be then allowed to run into the trough until it is nearly full, the head of water will be sufficient to cause it to flow through the glass tube into the bottle with just enough force to produce a gentle agitation or circulation of the material. The water passes off through the meshes of the cloth.

The trough may, of course, be made of any material, of any size,